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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/823,355

04/12/2004

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NOVE100042000/NVLS-2898

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83686

7590

02/18/2010

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EXAMINER

BAND, MICHAEL A

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

02/18/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 4-7, 9-11, 13-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman et al (US Patent No. 5,589,224) in view of Chung et al (US Patent No. 6,171,453).

With respect to claims 1-2, 13-15, and 20, Tepman et al discloses an apparatus for full wafer deposition with a shield arrangement that prevents deposition in the area of a chamber surrounding a substrate (i.e. wafer) (abstract). Tepman et al further discloses in fig. 2 the chamber [2] comprises lower, side, and upper walls, a lifter apparatus [90] for moving a pedestal [80] between a lower unloading position and a raised deposition position, and a sputter target [70] above said pedestal [80]. Fig. 5 further depicts the pedestal [80] having an extended segment (i.e. pedestal shield) [82] that is movable between the raised position and lowered position and has a portion that resides below a top plane of said pedestal [80], with said extended segment [82] having an outwardly and downwardly extending portion surrounding and extending from said pedestal [80] toward the chamber [2] lower walls and an outwardly and upwardly curving end extending toward said chamber [2] side walls. Fig. 5 also depicts a sidewall

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shield [60] comprises a cylindrical portion [100] that extends around and within the chamber sidewalls along with downward from an upper portion, said sidewall shield [60] extending in a curved inwardly and downwardly extending pattern with a lower end [62] disposed below an upper surface plane of the pedestal [80] and adjacent to the upper portion of the pedestal shield [82] when said pedestal [80] is raised. Fig. 5 further depicts that the lower end [62] is above the pedestal [80] when said pedestal [80] is in the lowered position a distance sufficient to permit a wafer (i.e. substrate) to be horizontally loaded onto said pedestal [80] via slit valve-controlled opening in chamber wall (col. 5, lines 20-49), with said pedestal shield [82] and said sidewall shield [100] cooperating when the pedestal [80] is in the raised position to avoid contact with each other and prevent line of sight deposition from the sputter target [70] to the side and lower walls of the chamber [2]. Tepman et al also discloses the shield [60] and the pedestal [80] are configured to be easily removed from the chamber [2] (col. 6, lines 16-19). The cropped figure below of fig. 5 serves to further clarify the raised position, the lowered position, and a robot blade for horizontally transporting the wafer (i.e. substrate) into and out of the chamber [2] without interference from the pedestal shield [82].

Chung et al further teaches a sidewall shield [48] used for physical vapor deposition with a pedestal [82] having a pedestal shield [84] capable of moving up and down inside a deposition chamber [80] (abstract; figs. 6A-6B). Figs. 6A-6B depict the sidewall shield [48] having an extension to a lower end that extends below the pedestal [82] and forms a bottom wall shield (i.e. inward portion) that extends along a lower wall of the deposition chamber [80], with said bottom wall shield extending upward with a lower portion of the pedestal shield [84] between said extension and said bottom wall shield. Chung et al also teaches the pedestal shield [84] being attachable to the pedestal [82] (col. 6, lines 59-64).

It would have been obvious to one of ordinary skill in the art to substitute the two-piece pedestal shield and pedestal as taught by Chung et al in place the single-piece pedestal shield and pedestal of Tepman et al to attain the predictable result of blocking line-of-sight to prevent deposition particles from depositing on the chamber sidewalls and bottom. It further would have been obvious to one of ordinary skill in the art to have the pedestal shield attachable (i.e. removable) to the pedestal since it has been held that if it were desirable for any reason to obtain access to the pedestal, it would be obvious to make the pedestal shield removable for that purpose. See MPEP 2144.04, Section V, Part C. In this case, it is desirable to remove only the pedestal shield in order to replace or clean said pedestal shield due to deposited material while leaving the pedestal in place, thus it is obvious to make said pedestal shield removable. It further would have been obvious to one of ordinary skill in the art to use the two-piece pedestal shield and pedestal taught by Chung et al to prevent deposition particles from depositing on the chamber sidewalls and bottom as taught by Tepman et al since using a known technique of pedestal shields for preventing deposition material accumulating on the chamber sidewalls and bottom is desired in Tepman et al. It further would have been obvious to one of ordinary skill in the art to try using the two-piece arrangement of Chung et al in attempt to improve the single-piece arrangement of Tepman et al, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp since the pedestal shield is either permanently attached to the pedestal (i.e. single-piece) or removable (i.e. two-piece).

With respect to claims 4-5 and 16, modified Tepman et al further discloses in fig. 5 the sidewall shield [60] having the lower end [62] disposed below and outward of an

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upper surface plane of the pedestal shield [82] when said pedestal [80] is raised, with fig. 5 also depicting the pedestal shield [82] having the upper portion surrounding said pedestal [80] and having an outwardly and downwardly extending portion surrounding and extending from said pedestal [80] toward the chamber [2] lower walls. Fig. 5 further depicts the sidewall shield [60] having the lower end [62] disposed below and outward of the upper surface of the pedestal shield [82] in addition to said lower end [62] being inward of the outward portion of said pedestal shield [82] when the pedestal [80] is raised.

With respect to claims 6-7 and 17-18, modified Tepman et al further discloses in fig. 5 the pedestal shield [82] having an upper portion surrounding the pedestal [80] and a lower portion extending downward toward the chamber lower wall and an outward portion extending upward and away from said lower portion, with the sidewall shield [60] having a lower end disposed outward of said upper portion of said pedestal shield [82] and inward of said outward portion of said pedestal shield when said pedestal [80] is in the raised position. Fig. 5 also depicts the sidewall shield [60] having an outward portion [102] between the sidewall of the chamber [2] and the lower end of said sidewall shield [60], where said outward portion [102] is disposed outward of the outward portion of the pedestal shield [82] when the pedestal [80] is in the raised position.

With respect to claim 9, modified Tepman et al further depicts in fig. 5 the sidewall shield [60] having the lower end that is above the pedestal shield [82] when the pedestal [80] is in the raised position, where said pedestal shield [82] extends outward from said pedestal [80] toward sidewalls of the chamber [2] and below said lower end of said sidewall shield [60].

With respect to claims 10-11, Chung et al further teaches a sidewall shield [48] used for physical vapor deposition with a pedestal [82] having a pedestal shield [84] capable of moving up and down inside a deposition chamber [80] (abstract; figs. 6A-6B). Figs. 6A-6B depict the sidewall shield [48] having an extension to a lower end that extends below the pedestal [82] and forms a bottom wall shield (i.e. inward portion) that extends along a lower wall of the deposition chamber [80], with said bottom wall shield extending upward with a lower portion of the pedestal shield [84] between said extension and said bottom wall shield. Figs. 6A-6B also depict the bottom wall shield having a lower portion extending along the lower wall, and inward and outward portions extending upward from the bottom shield lower portion, with said bottom wall shield inward portion extending inward of the pedestal shield [88] lower portion and the bottom wall shield outward portion extending outward of the pedestal shield [84] lower portion.

3. Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman et al (i.e. Ref 1) (US Patent No. 5,589,224) and Chung et al (US Patent No. 6,171,453) as applied to claim 1 above, and further in view of Tepman et al (i.e. Ref 2) (US Patent No. 5,803,977).

With respect to claims 21-24, the references are cited as discussed for claim 1. Chung et al further teaches in figs. 6A-6B the pedestal shield [84] removably attached to an end portion of the pedestal [82] via a mechanical connection [92] (col. 6, lines 51-64). The cropped figure below of fig. 6A serves to further clarify the pedestal end portion.



However Chung et al is limited in that it is not suggested for the end portion of the pedestal to be a separate isolated ring.

Ref 2 teaches a removable deposition shield assembly [550] for a sputtering chamber, where said deposition shield assembly [550] comprises a removable shield ring [20] resting and secured directly on a removable deposition (i.e. pedestal isolator) ring [522] where said deposition ring [522] is attached to a pedestal [504] (abstract; fig. 6). Ref 2 further teaches that “in essence, the deposition ring [522] is a removable extension [i.e. end portion] of [a] support surface of the pedestal [504]” (col. 6, lines 8-9). Ref 2 cites the advantage of using the deposition ring as preventing deposition on the chamber and hardware outside the processing region and facilitating replacement of the deposition ring due to built-up deposition material (abstract; col. 7, lines 28-35).

It would have been obvious to one of ordinary skill in the art to use the deposition ring as taught by Ref 2 in place of the end portion of the pedestal of Chung et al to gain the advantages of preventing deposition on the chamber and hardware outside the processing region and facilitating replacement of the deposition ring due to built-up deposition material. In addition since both Chung et al and Ref 2 teach end portions of a pedestal to prevent deposition particles from reach the bottom of the deposition

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chamber, it would have been obvious to one of ordinary skill in the art to replace the end portion of Chung et al with the end portion comprising a deposition ring taught by Ref 2 to attain the predictable results of preventing deposition particles from reaching the bottom of the deposition chamber. In addition it would have been obvious to one of ordinary skill in the art to try making the end portion of the pedestal separate from said pedestal in an attempt to improve the prevention of deposition particles from reaching the bottom of the deposition chamber along with improving the replacability of various components of the pedestal. In addition it has been held that the use of a one piece construction instead of the structure disclosed would be merely a matter of obvious engineering choice. See MPEP 2144.04, Section V, Part B. Therefore one of ordinary skill would find it obvious that the end portion of the pedestal taught by Chung et al and the claimed isolator ring (i.e. end portion) of the pedestal represents a mere matter of obvious engineering choice.

The combination of the reference Chung et al teaching a removable pedestal shield attached to an end portion of a pedestal via a mechanical connection with the reference Ref 2 teaching a removable pedestal shield resting and secured on a deposition ring on an end portion of a pedestal yields a removable pedestal shield removable attached and secured to an end portion that is a deposition (i.e. pedestal isolating) ring via a mechanical connection.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent

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and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1-2, 4-7, 9-11, 13-18, and 20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 20-28 of copending Application No. 12/169238. Although the conflicting claims are not identical, they are not patentably distinct from each other because both references claim a shielding system for a physical vapor deposition chamber, the chamber having a pedestal movable between a lowered loading and unloading position and a raised deposition processing position and surrounded by chamber interior lower, side and upper walls, the chamber further including a sputter target above the pedestal, the shielding system comprising: a pedestal shield attachable to the pedestal and movable therewith between the lowered and raised positions, the pedestal shield having an outwardly and downwardly extending portion surrounding and extending from the pedestal toward the chamber lower walls and an outwardly and upwardly curving end extending toward the chamber side walls; and a sidewall shield adapted to extend substantially around and within the chamber sidewalls, and downward from an upper

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portion thereof, the sidewall shield having a curved inwardly and downwardly extending portion with a lower end extending inward and disposed below a pedestal upper surface plane and adjacent the pedestal shield upper portion when the pedestal is in the raised position, the sidewall shield lower end being above the pedestal when the pedestal is in the lowered position a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal, the pedestal shield and sidewall shield cooperating, when the pedestal is in the raised position, to avoid contact with each other and prevent line-of-sight deposition transmission from the sputter target to the side and lower walls of the deposition chamber .

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

103 Rejections

6. On p. 14, the Applicant argues that the Examiner has contradicted himself, by stating that Tepman et al discloses the pedestal shield attachable to the pedestal on p. 3 of the Office Action, but then states on p. 8 of the Office Action that Tepman et al in that the pedestal shield being attachable to the pedestal is not suggested..

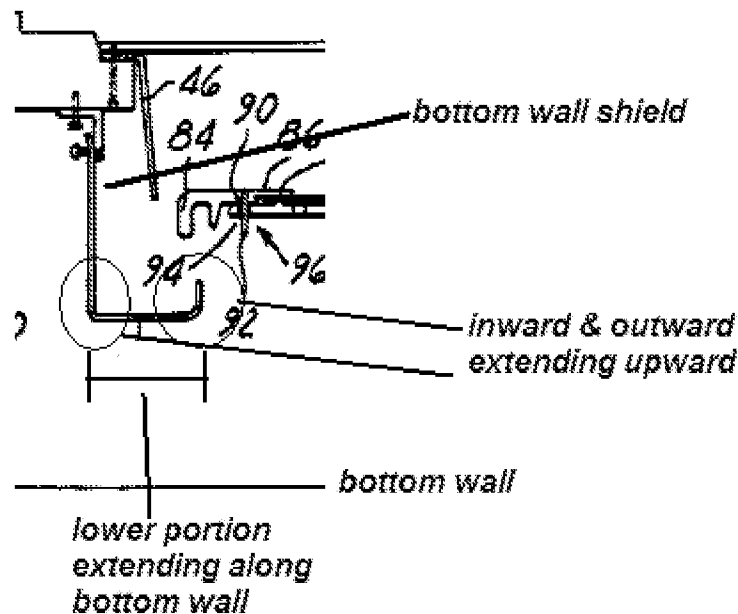
The Examiner respectfully disagrees. The previous Office Action on p. 3 discussed an anticipatory 102 rejection, where on p. 8 an obviousness 103 rejection was discussed. Since both rejections require quite different standards, different interpretations may be present. Therefore the 102 rejection, it is interpreted that Tepman et al anticipates that the pedestal is attachable to the pedestal at col. 6, lines

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16-21. However 103 rejection interprets that while Tepman et al discloses a configuration comprising a removably attachable pedestal, the pedestal shield being removably attachable to the pedestal is not suggested. Since the 102 rejection and the 103 rejection, and thus their respective interpretations, are to be taken separately and not combined, no contradiction exists.

7. On p. 14-15, the Applicant argues that Chung et al does not teach the pedestal shield and sidewall cooperating when the pedestal is in the raised deposition position. The Applicant also argues that Chung et al does not teach a bottom wall shield having a lower portion extending along a bottom wall with inward and outward portions extending upward from said bottom wall lower portion.

The Examiner respectfully disagrees since the secondary reference Chung et al was not used to teach this cooperation; Tepman et al (i.e. Ref 1) explicitly and clearly teaches in fig. 5 the pedestal [80] in the raised position with the pedestal shield [82] cooperating with the sidewall shield [60]. In addition in response to Applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Examiner also would be remiss in not pointing out that Chung et al also does depict in fig. 8 all three shields [46], [48], [84] cooperating when the pedestal [82] is in the raised position to prevent deposition from reaching the bottom wall (i.e. floor), with fig. 6B depicting the bottom wall shield having the claim limitations. The cropped figure below of fig. 6B serves to further clarify these claim limitations.



Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent No. 6,051,122.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795